

Management of the Retained Percutaneous Nephrostomy Catheter

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ABSTRACT

Percutaneous nephrolithotomy is a widely accepted treatment for urinary calculi, but it is not without complications. We present the case of a 76-year-old male with a retained council tip catheter after percutaneous nephrolithotomy. Fluoroscopic guidance was used to perform percutaneous puncture of the catheter balloon, and the catheter was removed without complication. Advantages of various nephrostomy tube designs and additional measures to prevent this type of complication are discussed.

Key Words: Urinary catheterization, Percutaneous, Nephrostomy.

INTRODUCTION

Percutaneous nephrolithotomy (PCNL) is a widely accepted treatment for urinary calculi >2 cm or resistant to other modalities. Complications of this procedure are well reported; however, to our knowledge no mention has occurred in the literature of a retained nephrostomy tube after PCNL. Thus, we will present the management of a retained council tip catheter after PCNL.

CASE REPORT

A 76-year-old gentleman underwent a PCNL for a 2.2x1.4-cm lower pole calculus via an uneventful upper pole puncture. Incomplete stone fragmentation was obtained using the ultrasonic lithotripter; therefore, a 24-French council tip nephrostomy tube was placed, the balloon was inflated with 3 mL of sterile water, and the patient was scheduled for a second look nephroscopy when a holmium laser was available.

One week later at the second look nephroscopy, attempts to deflate the catheter balloon were unsuccessful. After transection of the balloon port valve, attempted passage of a 0.038 movable core Bentson guidewire down the balloon port was unsuccessful. An antegrade nephrostogram outlined the catheter balloon within the renal pelvis (**Figure 1**). With the C-arm in a vertical orientation, an 18-gauge Chiba needle (Cook, Bloomington IN) was advanced through a puncture site directly over the balloon under fluoroscopic guidance. Angulation of the C-arm was used to determine the depth of advancement. The balloon was successfully punctured by the Chiba needle with clear efflux through the needle. Fluoroscopy confirmed complete deflation of the balloon (**Figure 2A**). Contrast was then instilled through the Chiba needle to evaluate the integrity of the balloon and exclude the possibility of retained balloon fragments from a ruptured balloon (**Figure 2B**). Flexible nephroscopy was performed to evaluate for balloon fragments, which were not identified, and to remove the lower pole stone. Tubeless PCN was then completed.

DISCUSSION

A retained urethral catheter due to balloon malfunction is a well-recognized urologic complication. Many solutions

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to this problem have been attempted, including overinflation until rupture, puncture of the balloon via a wire through the balloon port, and puncture of the balloon under ultrasound guidance via a suprapubic or transvaginal route.¹ Given this infrequent but known complication

of balloon-type cystostomy catheters, it is not surprising that a similar complication occurred in our patient. Our familiarity with the use of the Chiba needle and 3-dimensional fluoroscopy for percutaneous renal access facilitated percutaneous puncture of the catheter balloon. If equipment or experience limits the urologist's ability to perform this technique, collaboration with an interventional radiologist using conventional C-arm or ultrasound for guidance should be considered.

Prevention of a retained catheter due to a balloon-port malfunction requires use of sterile water instead of saline and limiting the time of catheter placement. A nonballoon type nephrostomy tube would be another option. Malecot tubes have been utilized for nephrostomy drainage, but these tubes are not without difficulties. Tissue bridge formation over flanges of the tube has occurred, requiring endoscopic removal.^{2,3} Tubeless PCNL would avoid these issues entirely; however, the tubeless technique is contraindicated in the face of significant postoperative bleeding, urinary extravasation, ureteral obstruction, or anticipated need for a second-look nephroscopy. Pigtail catheters following PCNL may represent a good alternative for drainage and access, while minimizing the risk of catheter malfunction or retention.

References:

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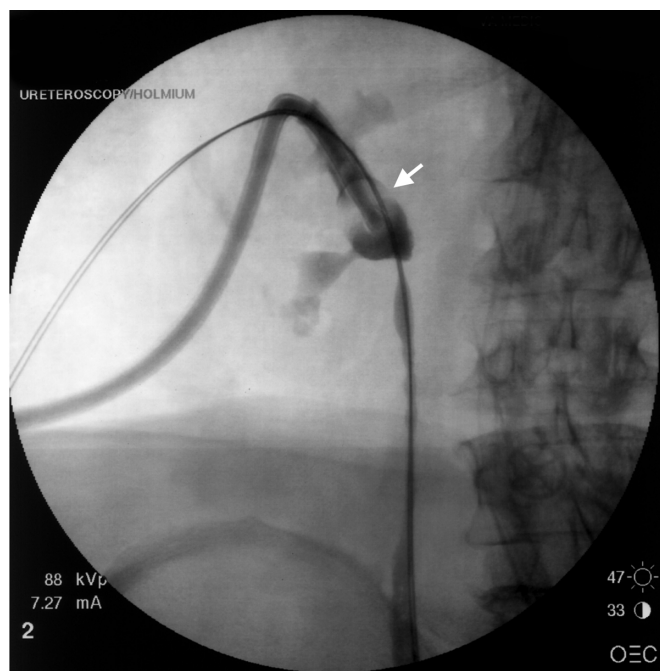


Figure 1. Inflated catheter balloon (white arrow) seen as filling defect within renal pelvis.

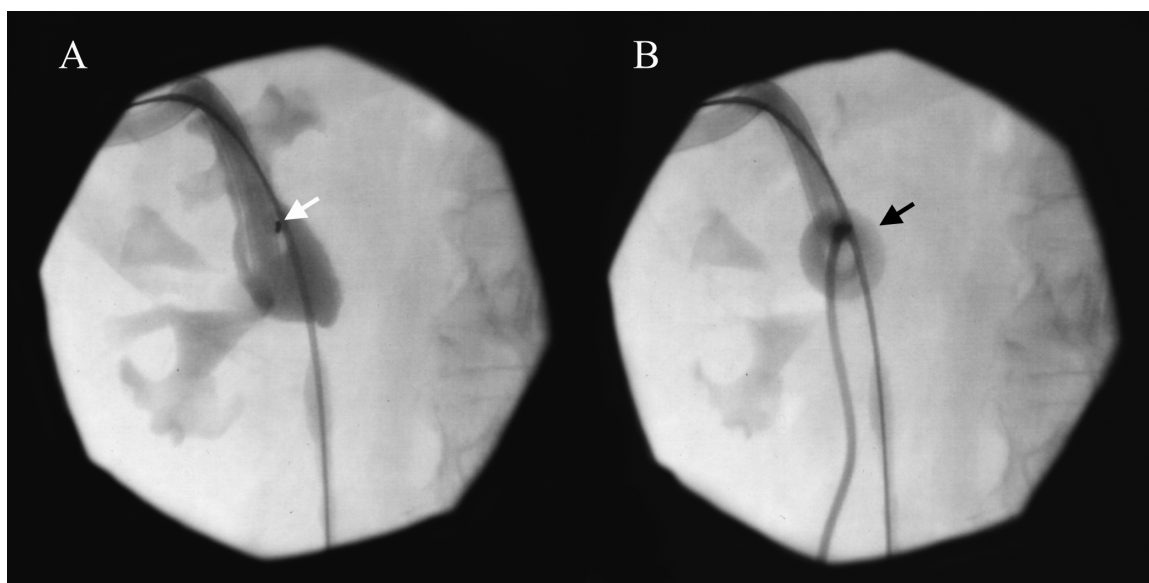


Figure 2. (A) Chiba needle (white arrow) has punctured and drained the catheter balloon. (B) Contrast injected via Chiba needle has filled the catheter balloon (dark arrow) and confirmed its integrity.

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